

REMARKS

In this Amendment, Applicant has amended Claims 1, 2, and 4 to specify different embodiments of the present invention and overcome the rejection. It is respectfully submitted that no new matter has been introduced by the amended claims and specification. All claims are now present for examination and favorable reconsideration is respectfully requested in view of the preceding amendments and the following comments.

OBJECTIONS TO SPECIFICATION AND CLAIMS:

The specification and Claim 1 has been objected as containing certain informalities.

It is respectfully submitted that in view of the present amendments, the objection has been overcome. In particular, it is not clear what “the list of references” on page 4” means. The current version of the specification was submitted on January 18, 2005 as Substitute Specification. There is no “list of references” on page 4. The original specification as filed had a list of reference numbers. These reference numbers are helpful for a person of ordinary skill in the art as well as the Examiner to fully understand the invention. Therefore, Applicant believes that it is not necessary to delete these reference numbers. However, if this issue becomes the only issue pending before allowance of this application, the Examiner is invited to contact the undersigned attorney for a possible Examiner’s amendment.

Regarding the objection of the term “a resilient contact mobile member”, Applicant respectfully submits that such term in Claim 2 refers to “a resilient member” in Claim 1. Because there is sufficient written description and support for “a resilient member” in the specification, e.g. paragraph [0014], page 3, line 25 of the pending specification.

In Claim 1, “said” has been added in front of “chain engaging means.” The grammatical error has been corrected.

Therefore, the objection has been overcome. Accordingly, withdrawal of the objections is respectfully requested.

REJECTIONS UNDER 35 U.S.C. § 112 SECOND PARAGRAPH:

Claims 1, 2 and 4 have been rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is respectfully submitted that Claims 1, 2, 4 have been amended to clearly point out and define the embodiment of the present invention. More specifically, in Claims 1 and 4, the term “each” has been deleted so that it is clear that two opposite ends of the frame include a flywheel and a sprocket, respectively.

The term “used for unidirectional movement” has been deleted. During operation, slipping module 4 is pulled upwards and downwards by pull-up rod 13 and 21 simultaneously. When pulled upwards, pull-up rod 13 goes upwards and acts at the hole 28 to connect rod nose in Fig. 3. Then chain engaging toothed bar 19 swings to the right, chain-engaging teeth 31 inserts in the chain 3 in the left side to remain the rotation in the same direction. Alternatively, jogger 41 in the embodiment in Fig. 5 will bring the both sides of the lower part of chain engaging toothed bar 19 to insert in chain 3 in the order of first left and then right and enable the chain to work.

The Examiner pointed out that “it is unclear how the tooth plate is ‘tilted’ towards two opposite directions.” Applicant has amended to relevant part of the claim to read “two chain-engaging teeth positioned on the chain engaging tooth plate; said two chain-engaging teeth tilted towards two opposite directions.” During operation, slipping module 4 (including slide bar 12 and 20) slides together with slave slide bar 16 and 18 and is positioned inside guide tongue 11A and precisely slide upwards and downwards along its surface and hence prevent or reduce the twist of sliding assembly.

Regarding float connection, Claim 1 has been amended to recite “operably connected.” Chain engaging toothed bar 19 lies in chain engagement means 14 that follows sliding slipping module 4. The process is: under the action of pedaling force, pull-up rod pulls chain engaging toothed bar 19 that inserts chain. Chain engagement means 14, slave slide bar 16 and 18 move along guide column 7 and auxiliary frame pillar 11. In the course of upward and downward movement, chain drives flywheel to enable the coaxial driving wheel to run. As chain engaging toothed bar 19 is dynamically connected with slipping module 4, it is called “float connected”.

In addition, Claim 1 has been amended to delete “or indirectly.” During the operation of reversing compensation means 10 (see Fig. 4), arm 37 and damp spring leaf 39 are continuously brought to dashed-line position by the front of chain tooth in forward direction operation, while in reverse direction operation, under the action of tension spring 35, damp spring leaf 39 adhered to the upper part of arm 37 is pulled to solid line position. Then, the upper part of arm 37 supports the rear tooth surface of chain tooth. The rotation of arm is limited by strong compressed spring 36 and its upper end blocks the rear tooth surface of chain tooth to produce a no-return effect with a slight contractile leeway.

Finally, Claim 2 has been amended to refer to the resilient member in Claim 1.

Therefore, the rejection under 35 U.S.C. § 112, second paragraph, has been overcome. Accordingly, withdrawal of the rejections under 35 U.S.C. § 112, second paragraph, is respectfully requested.

REJECTIONS UNDER 35 U.S.C. § 102:

Claims 1, 2 and 4 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Farnos (US 6,129,646), hereinafter Farnos.

Applicant traverses the rejection and respectfully submits that the presently claimed invention is not anticipated by the cited reference because there are significant

differences between the present invention and Farnos; and Farnos did not disclose all the limitations of the present invention as amended. According to MPEP 2131, "A claim is anticipated only if **each and every element** as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Applicant respectfully submits that the structure in Farnos is significantly different from the present invention as claimed. More specifically, Farnos is not a single chain drive. Instead, it adopts four chains: a chain 50 with left and right pedals, a traditional driving chain 18, and other two chains 72 on coaxial sprocket 24, 26. In addition, its chain 50 where pedals lie is not a circular chain. Since pedal 44 is mounted on chain 50 and alternately brings the chain, only upward and downward pedaling in reciprocation can be conducted. The newly added two chains 72 are linked with the chain 50 through sprocket 70 and guide 76 in pedal position, and are selectively converted pursuant to the clutch of assembly 20 in the center of sprocket 24, 26.

In addition, two clutches 27 and 29 provided in sprocket 20 carry out reversing and finally enable driving chain to bring driving wheel forwards. A damp spring is provided on the support of pedal chain and through pedal position to link chain 70 and transmit driving power, thus no reversing compensation means is provided.

Furthermore, since a way of match coupling between chain 72 and guide 76 in pedal position is adopted, no chain shaking or detachment occurs..

Moreover, the various components of Farnos identified by the Examiner as disclosing the limitations of the present invention are incorrect. For example, frame member 32 of Farnos is not a guide column as defined in the present application. The Examiner has not identified "an auxiliary frame pillar" or "frame end paltes". Rollers 52/54 in Farnos are not flywheel and slave sprocket of the present invention. The flexible member 50 of Farnos is not a single endless chain as defined in the claims. Two pedal mount members 46 of Farnos are not a sliding assembly for driving. Chains 72 of Farnos is not a slave chain-engaging and reversing mechanism. Rollers 40 are not slide bars in the claims. Mount pedals 42,44 of Farnos do not disclose one pedan and at least

one hand-controlled rod. Sprocket 70 of Farnos is not a chain-engaging means of said slave chain-engaging and reversing mechanism. The combination of projecting portion or member 60 of Farnos is not the chain-retaining board. Guide member 76 is not a chain-retaining arc projection. Finally, coil compression springs 66 of Farnos are not a reverse compensation means.

In comparison with Farnos, the present invention is individually characterized by single chain driving, recycling chain, pedal (or hand rod) without complex applying-force chain, no clutch but adopting sliding assembly with chain engaging toothed bar and reversing compensation means. Thus, Farnos failed to disclose each and every limitation of the claims as amended.

Other references in PTO-892 and specification: Applicant respectfully submits that none of the other references in PTO-892 and mentioned in specification as well as IDS fail to disclose nor suggest the present invention as disclosed. The differences of structure and feature between relative schemes for comparison are listed below respectively:

1) A-US-6090002A

In this patent applied by inventor George T. Farnos on Sept. 8, 1998, classical structure of double chain links is used for force transmission: including a transmission chain used for applying reciprocating force with pedals, and a sprocket driving shaft to bring drive wheel. The drive shaft is set in high position. Chain links are interconnected by reciprocating transmission member coaxially operated with sprocket crank. The structure and member processing for the patent are quite complex.

2) B-US-6113510A

In this modified patent applied by inventor George T. Farnos on Dec. 24, 1998 and stressed by patent examiner, the structure of double chain links is also used for transmitting force: including a transmission chain used for applying force with pedals, and a sprocket driving shaft to bring drive wheel. The drive shaft is set in high position. The structure of double-ended stub shafts or rollers 76 in guide or backing rollers 70 in US-6090002A is modified. By the combination of transmission chain with receptacles 80, double-ended stub shafts or rollers 76 and two rotatable crank members with rollers, the rotatable crank member 24, 26 and sprocket 20 are coaxially fixed on two sides.

Compared with old patent, the transmission member of chain is more delicate without change of basic structure. The configuration of double rotatable crank members has the same principle as the following D.US-6412802B1 that uses complex bidirectional clutches (see Fig. 5). The rotatable crank member 24, 26 are integrated with clutch after installation.

3) C-US-6237928B1

This patent has two individual chain links that belong to the transmission type of double chain links with bevel gear transmission system. The force applied brings a chain link to run in a reciprocating way, using three bevel gears to combine an assembly with one reciprocating bevel gear and the other two bevel gears engaging each other to realize reversing and bring driving shaft to continuously run in one direction, thus making drive wheel go forwards. This patent features complex structure and high cost.

4) D-US-6412802B1

In this patent, a plurality of rack gears connected with pulley and rope drive the two sector rack bars fixedly connected with driving shaft sprocket that brings chain links to drive rear wheel forwards. Since multiple bidirectional clutches are used, the downward stroke of rack gear on the other side can also continuously bring chain link and no idle stroke happens. This kind of complex chain link system with additional double rack gears is not easily repaired and will have a fairly high rate of trouble.

5) E-US7048290B2

This patent utilizes two sprockets installed on the driving shaft. Applying force with double feet in one direction brings chain links of sprocket to rotate and further bring the chain links of another sprocket to drive rear wheel. In the course of reset, the system is in idle state. It has no reciprocating and bidirectional driving function. It belongs to the transmission by double chain links.

6) F-FR,A,2544042

A document of FR,A,2544042 was set for comparison. In PCT application, Applicant clearly gives out the abstract for reference:

The invention relates to a mechanism allowing the efficiency of a connecting rod-crank system to be enhanced in order to increase the useful stroke. This mechanism converts the reciprocating forces which are applied to it into a rotational torque of constant value by means of a system composed of two chains or belts 2 equipped with push rods 1 enslaved to one another by a cable 7 stretched over a pulley 8, each chain or belt being stretched between an idler pulley or sprocket 4 mounted on an intermediate shaft 5 and

a pulley or sprocket with a free wheel 3 mounted on an output shaft 6. This mechanism is intended mainly, but not exclusively, for converting human energy into mechanical energy.

In figure, both pedals are separately fixed in two chain links. Upward and downward reverse is carried out by an idler and its rope/chain between pedals, and output from driving shaft 6. This patent uses the transmission of double chain links with free pulley. The above-mentioned documents for reference were listed in background art in PCT retrieval and seemed to have nothing to use for reference

The following three items are original documents for reference mentioned in the specification of the present application:

7). CN1275511A

The structure of double chain links is provided on both sides of cycle frame. Three flywheels are disposed in triangular shape. Both rack gears are set along the section of cycle frame. A rider can apply force alternately with pedals on rack gears, and bring drive wheel with flywheel guiding sprocket shaft. In the cycles for new purposes of transport, entertainment and sports, rack gears and six flywheels generate a high cost.

8). CN1298824A

This patent uses the transmission structure of double chain links in series and relay. An impulsive shaking rod 14 to apply force upwards and downwards on both sides is provided and when shaking, operates in the order of connecting rod 5 — slave shaking rod — roller 6 — small sprocket with ratchet 12 — large sprocket 13 — chain link — small sprocket 17 — coaxial secondary large sprocket — driving chain link — small sprocket 21 — coaxial driving wheel 20. This patent is aimed at saving energy on up slope, but saving energy does not save power. This patent has complex structure and multiple transmission and conversion links, causing a low efficiency.

9). CN01134621.2

On the basis of 7) CN1274611A, this patent removes original rack gear and pedal, but extends chain and add a slave sprocket 3 and derailleur 1. A tracking rope is provided to draw the derailleur to work. Pedals (sheath) are changed on sliding path 11 on both sides of front handlebar. Its wire rope will be curled during transmitting torque by small pulley and such curl will even affect normal operation. Besides, sometimes operation will be failed during reversing.

FR A2544042, CN1275511A, CN1298824A and CN01134621.2 are enclosed for examiner's reference.

In summary, the present invention is different from the above-mentioned documents for comparison in the following respects:

1. Objects are different.

This invention is to provide a linear reciprocating propulsion apparatus manually driven and suitable for use in vehicle and ship, particularly the propulsion apparatus for body exercising and entertainment rather than common bicycle, which needs good universality of installation. Thus we hope all force transmission system and traditional main transmission system are integrated in structure. The single-chain circulation system of this invention has the advantage of "flexible way of applying force and large leeway of development and design" in similar technique (paragraph (0008) in BACKGROUND OF THE INVENTION), and such universality is demonstrated through Fig. 8 and 11.

2. Structure features are different.

In popular bicycle, single-chain transmission is a best structure. Through the sprocket of driving shaft and chain to directly drive wheel, this mechanism has the highest efficiency of transmission. This invention also belongs to single-chain transmission and can be directly installed on the driving shaft of drive wheel. However, it adopts applying force with feet and hands successively to propel the circulation of single-chain. This invention is characterized by chain engaging and reversing mechanism, chain-retaining board to prevent chain deviation, reversing compensation means to prevent or reduce possible impact during reversing, which is quite different in structure from prior art.

3. Invention effects are different.

Most of flywheels can be directly installed on driving shaft. The main frame is fixed on bicycle frame. The integral configuration is suitable for assembly and application. Since the alternate application of force with feet and hands falls on one sliding assembly, the forces from rider's waist and hips are needed so that the effect of exercising is quite good. The effect is similar to that of E-US-7048290B2 and different from other patents. To restore position, apply force with hands and assist with feet and hips.

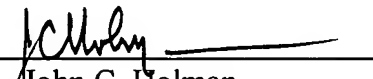
Therefore, the newly presented claims are not anticipated by Farmos and other references, and the rejection under 35 U.S.C. § 102(b) has been overcome. Accordingly, withdrawal of the rejection under 35 U.S.C. § 102(b) is respectfully requested.

Having overcome all outstanding grounds of rejection, the application is now in condition for allowance, and prompt action toward that end is respectfully solicited.

Respectfully submitted,

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Enclosures:

FR A2544042, CN1275511A, CN1298824A and CN01134621.2

Mechanism allowing the efficiency of a connecting rod-crank system to be enhanced

No. Publication (Sec.) : FR2544042

Date de publication : 1984-10-12

Inventeur :

Déposant : MELSEN MICHAUDET MONIQUE (FR)

Numéro original : ☒ FR2544042

No. d'enregistrement : FR19830005655 19830405

No. de priorité : FR19830005655 19830405

Classification IPC : F16H21/32; B62M15/00

Classification EC : B62M1/04

Classification EC : B62M1/04

Brevets correspondants :

Abrégé

The invention relates to a mechanism allowing the efficiency of a connecting rod-crank system to be enhanced in order to increase the useful stroke. This mechanism converts the reciprocating forces which are applied to it into a rotational torque of constant value by means of a system composed of two chains or belts 2 equipped with push rods 1 enslaved to one another by a cable 7 stretched over a pulley 8, each chain or belt being stretched between an idler pulley or sprocket 4 mounted on an intermediate shaft 5 and a pulley or sprocket with a free wheel 3 mounted on an output shaft 6. This mechanism is intended mainly, but not exclusively, for converting human energy into mechanical energy.

Données fournies par la base d'esp@cenet - I2

Description

La présente invention concerne un mécanisme augmentant la course utile du système bielle-manivelle en vue d'améliorer son rendement.

Avec le système bielle-manivelle classique, le couple transmis est nul lorsque la bielle et la manivelle sont alignées, c'est à dire aux points morts haut et bas, mais il est, par contre, maximum lorsque la bielle et la manivelle sont situées à 90° l'une de l'autre.

Il résulte de cette situation que le rendement de ce système de transmission est fonction de l'angle existant entre la bielle et la manivelle. Ce rendement est donc variable malgré la constance de la force appliquée.

Diverses solutions ont été envisagées pour remédier à cette situation, notamment dans le domaine du pédalier de bicyclette, parmi lesquelles on peut citer les dispositifs décrits dans les demandes de brevet français :

- 2.265 606 du 27 Mars 1974, qui concerne un moyen permettant de supprimer les points morts, constitué d'un plateau comportant une denture interne périphérique ainsi qu'une came excentrée à deux bras qui engage alternativement un bras dans le orantage tandis que l'autre y échappe; chaque bras étant relié par un tenon et un coulisseau à un levier semi-circulaire solidaire d'une manivelle.

- 1.362 167 du 25 Juin 1963, qui concerne un dispositif à pédalier, permettant la suppression du passage des points morts, comportant un plateau constitué de deux secteurs dentés semi-circulaires, l'un relié à la manivelle, l'autre à l'axe du pédalier, assemblés par deux bielles reliées à un excentrique réglable monté sur la cuvette du pédalier.

- 1.539 017 du 29 Mai 1967, qui concerne un pédalier mécanique destiné à amplifier la force appliquée à la pédale.

- 2.127 605 du 4 Février 1972, qui concerne une manivelle à couple de travail amélioré, dont la manivelle classique est prolongée par une autre manivelle qui reste toujours parallèle à la direction du mouvement par l'intermédiaire de pignons et de chaînes

- 2.218 236 du 16 Février 1973 concernant un pédalier de bicyclette qui supprime les points morts haut et bas, qui se compose d'une couronne elliptique dentée qui se fixe sur le plateau du pédalier.

Cependant, toutes ces solutions présentent comme inconvénients d'être trop spécifiques à la bicyclette et d'atténuer la variation du couple transmis sans la supprimer entièrement.

Le mécanisme selon l'invention vise à remédier à ces inconvénients car il permet de conserver un rendement de transmission constant et maximum durant l'application de la force F .

Ce mécanisme se caractérise principalement en ce que les forces alternatives qui lui sont appliquées sont transformées en couple de rotation par l'intermédiaire d'un système composé de deux chaînes ou courroies, asservies l'une à l'autre, tendues entre un pignon fou ou une poulie folle et un pignon ou une poulie à roue libre montées respectivement -sur un arbre intermédiaire et un arbre de sortie.

Les forces alternatives sont appliquées aux chaînes ou aux courroies par l'intermédiaire de poussoirs, montés sur glissières, fixés perpendiculairement à celles-ci.

Les chaînes ou courroies sont asservies l'une à l'autre par l'intermédiaire d'un câble tendu par une poulie à gorge, dont les extrémités sont reliées chacune à l'un des poussoirs transmettant les forces alternatives.

D'autres caractéristiques et avantages apparaîtront dans la description qui va suivre d'un mécanisme à chaînes réalisé selon l'invention, donné à titre d'exemple non limitatif au regard du dessin annexe représentant l'ensemble en élévation.

En se reportant à la figure du dessin, on remarque que les forces F_a et F_b sont appliquées alternativement aux poussoirs $1a$ et $1b$ fixés respectivement aux chaînes $2a$ et $2b$, tendues entre les pignons à roue libre $3a$ et $3b$ et les pignons fous $4a$ et $4b$, montés respectivement sur l'arbre intermédiaire 5 et l'arbre de sortie 6 .

Les poussoirs la et lb sont reliés entre eux par un câble 7, tendu sur une poulie à gorge 8. les poussoirs la et lb coulisent sur des glissières 9a et 9b solidaires d'un bâti IO.

Comme on le voit, lorsque la force Fa est appliquée sur le poussoir la, la chaîne 2a se met en mouvement et entraîne, par l'intermédiaire du pignon à roue libre 3a, l'arbre de sortie 6 jusqu'à ce que le poussoir arrive en fin de course. Pendant ce temps, la chaîne 2b s'est déplacée dans l'autre sens, sous l'action du câble 7 puisque les roues libres des pignons 3a et 3b sont montées de façon à permettre ce déplacement tout en assurant à tour de rôle l'entraînement de l'arbre de sortie 6. Le poussoir lb se trouve ainsi ramené à l'origine du déplacement de la force Fb qui peut être alors immédiatement appliquée, afin d'entretenir le mouvement puisque la force Fa vient de s'annuler.

Ainsi, le couple transmis à l'arbre de sortie 6 reste constant puisque les forces Fa et Fb sont toujours appliquées parallèlement à distance constante du plan de symétrie longitudinal du mécanisme, contrairement à ce qui se produit avec le système bielle-manivelle classique, ce qui se traduit par un rendement de transmission maximal.

Le mécanisme selon l'invention, est destiné principalement, mais non exclusivement, à la transformation de l'énergie humaine en énergie mécanique

Données fournies par la base d'esp@cenet - I2

Revendications

REVENDEICATIONS

1. Mécanisme permettant d'augmenter le rendement d'un système bielle-manivelle, caractérisé en ce que les forces qui lui sont alternativement appliquées sont transformées en un couple de rotation de valeur constante par l'intermédiaire d'un système composé de deux chaînes (2), équipées de poussoirs (1), et asservies l'une à l'autre, tendues chacune entre un pignon fou (4) et un pignon à roue libre (3) montés respectivement sur un arbre intermédiaire (5) et sur un arbre de sortie (6).

2. Mécanisme, selon la revendication 1, caractérisé en ce que les poussoirs (1) sont fixés sur les chaînes (2) perpendiculairement à celles-ci.

3. Mécanisme, selon la revendication 2, caractérisé en ce que les poussoirs (1) coulisent sur des glissières (9) solidaires d'un bâti (10).

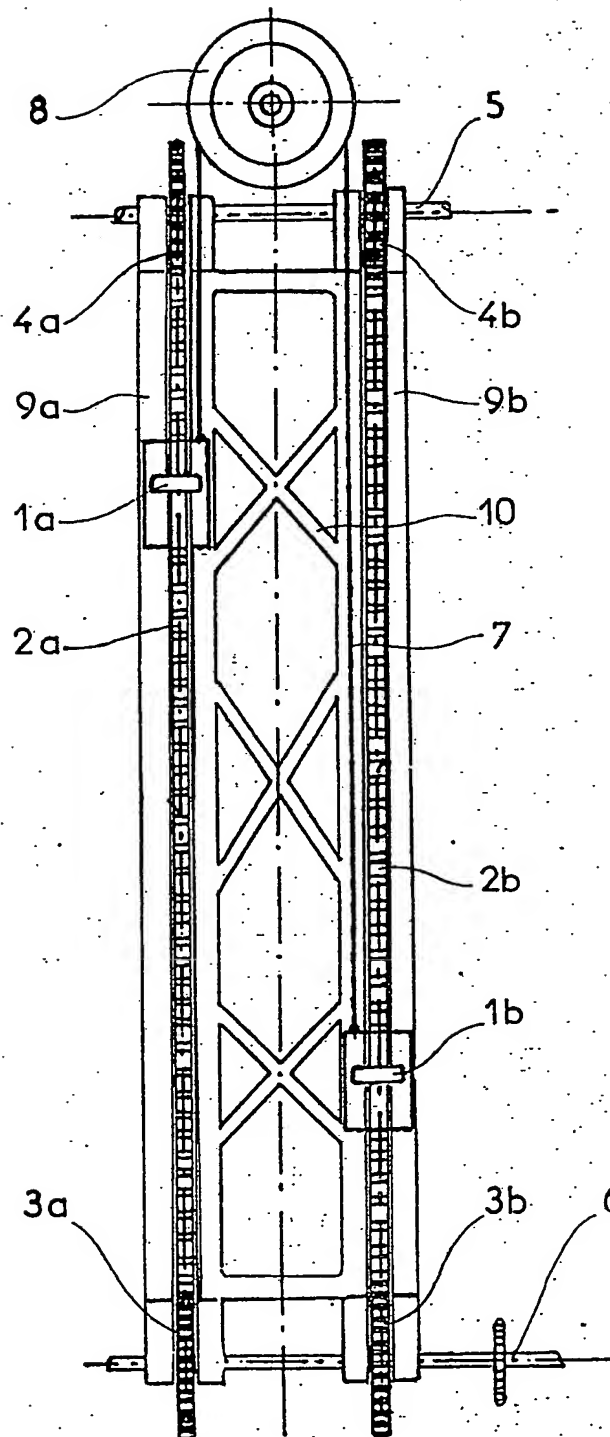
4. Mécanisme, selon la revendication 1, caractérisé en ce que l'asservissement des deux chaînes l'une à l'autre, est obtenu par l'intermédiaire d'un câble (7), tendu sur une poulie à gorge folle (8), dont les extrémités sont reliées aux poussoirs (1).

Données fournies par la base d'esp@cenet - I2

http://fr.espacenet.com/espacenet/fr/fr/e_net.htm

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[19]中华人民共和国国家知识产权局

[51]Int. Cl⁷

B62M 23/00

[12] 发明专利申请公开说明书

[21] 申请号 99108216.8

[43]公开日 2000年12月6日

[11]公开号 CN 1275511A

[22]申请日 1999.5.31 [21]申请号 99108216.8

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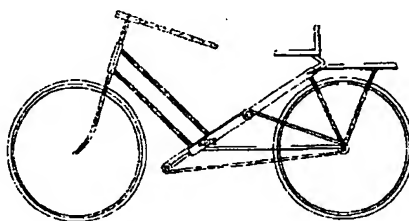
权利要求书 1 页 说明书 2 页 附图页数 10 页

[54]发明名称 LY-Z型自行车

[57]摘要

该车人踏力直蹬,往复运动,通过驱动系统使车前进,用于交通,娱乐,体育等。

驱动系统安装在方斜梁上,着力脚蹬,带动斜梁两边滑道内的齿条,齿条由安装于斜梁上的复位齿轮控制,往复运动,拉动链条,驱动自行车。



ISSN 1008-4274

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权 利 要 求 书

权 利 要 求 书

1、一种自行车其驱动装置有对称脚蹬、齿条、链条、飞轮、滑道，一个中介轮连通齿条，其特征是人依托车座着力脚蹬子，双腿作直线往复运动，驱动自行车。

2、依据权利要求1所述自笔车，其特征是：脚蹬子连齿条，齿条拉链条、链条带飞轮驱动自行车。滑道置斜梁上固定齿条，中介轮连通控制齿条，使齿条作往复运动。

3、根据权利所要求所述自行车，其特征：脚蹬作直线往复运动；中介轮连通齿条复位。

说明书

LY—Z型自行车

发明名称：LY—Z型自行车（通用26型），属机械类。

该车是人的踏力作直线往复运动通过驱动系统使自行车前进，改变了人的踏力作圆周运动通过驱动系统使自行车前进的传统模式。

在现代化交通工具云集的今天，作为代步交通工具的自行车，只有不断推陈出新，才能具有吸引力、竞争力和生命力，我研创LY—Z型自行车，就为此目的。

LY—Z型自行车长2000毫米，高1020毫米，二六型前后轮，此车前叉、车闸为通用型；车座为坐型，车头为伸缩型；车架由前斜梁（上下并列双梁）、方型斜梁、平梁、后叉组成；驱动系统置于方斜梁上，斜梁的中部、下部各安装左右对称飞轮两个，后轮轴上安装左右对称飞轮两个，这样每边呈三角形（三个飞轮）由封闭链条连通，斜梁两边对称安装平行滑道，滑道内安装齿条，由安装在斜梁上的复位齿轮连通控制，两齿条连接脚蹬、钳链条。在脚踏力的作用下，由复位齿轮控制，一齿条下行，另一齿条上行，作往复运动，拉动链条，驱动自行车。

和现行自行车比较，其优点为：

(1)、此车为人踏力直线往复运动驱动自行车，力向不变，做功集中，能量损耗少；

(2)、踏力往复行程中，无力的死点，每有加力，车则前进，速度均匀，波动小；速度比大，经计算为1：3.4，匀速加力，每小时在20公里以上。

(3)、以车座为依托，腰、臀、腿、脚至全身皆可加力，可调动人的最大力量。

(4)、重心低，稳定性好，乘坐舒适，不易疲劳；

说明书附图

LY—Z型自行车

说明书附图

图1是LY—Z型自行车总体装配图

图2 ($\frac{1}{2}$) 是LY—Z型自行车复合传动装置

图2 ($\frac{2}{2}$) 是LY—Z型自行车传动部分装配图

图3是LY—Z型自行车车头与手柄结构图

图4是LY—Z型自行车座及后架结构图

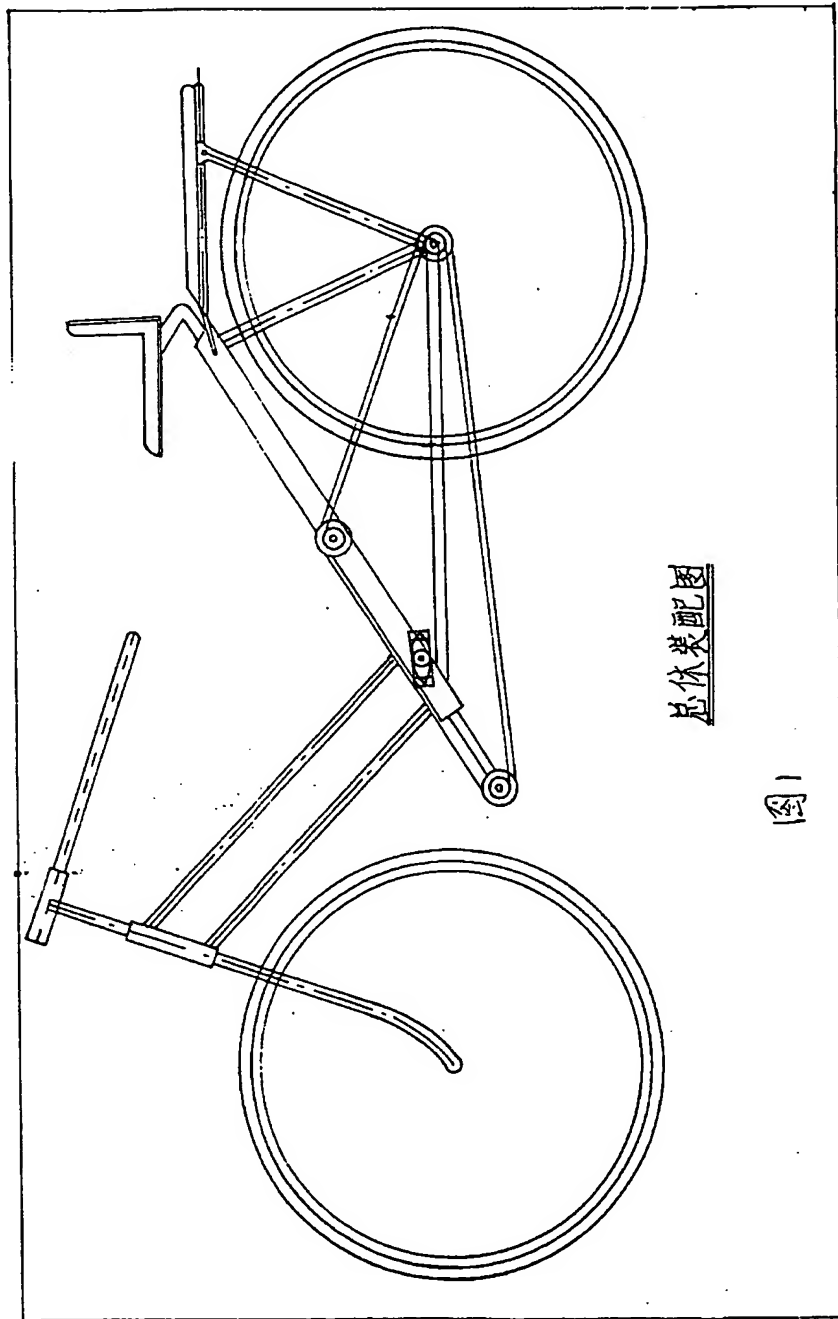
图5是LY—Z型自行车车头套筒结构图

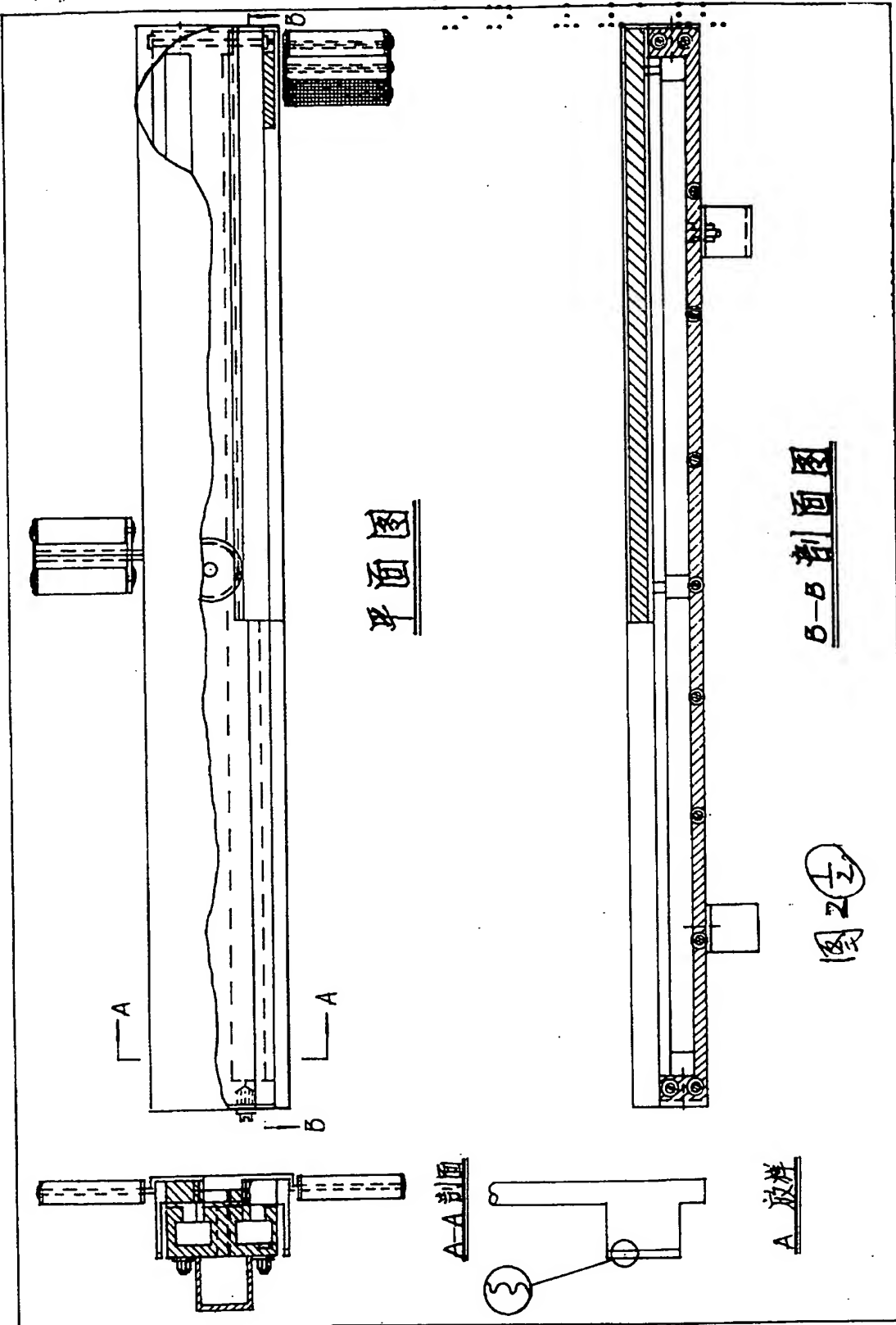
图6是LY—Z型自行车车头筒与前叉子连接图

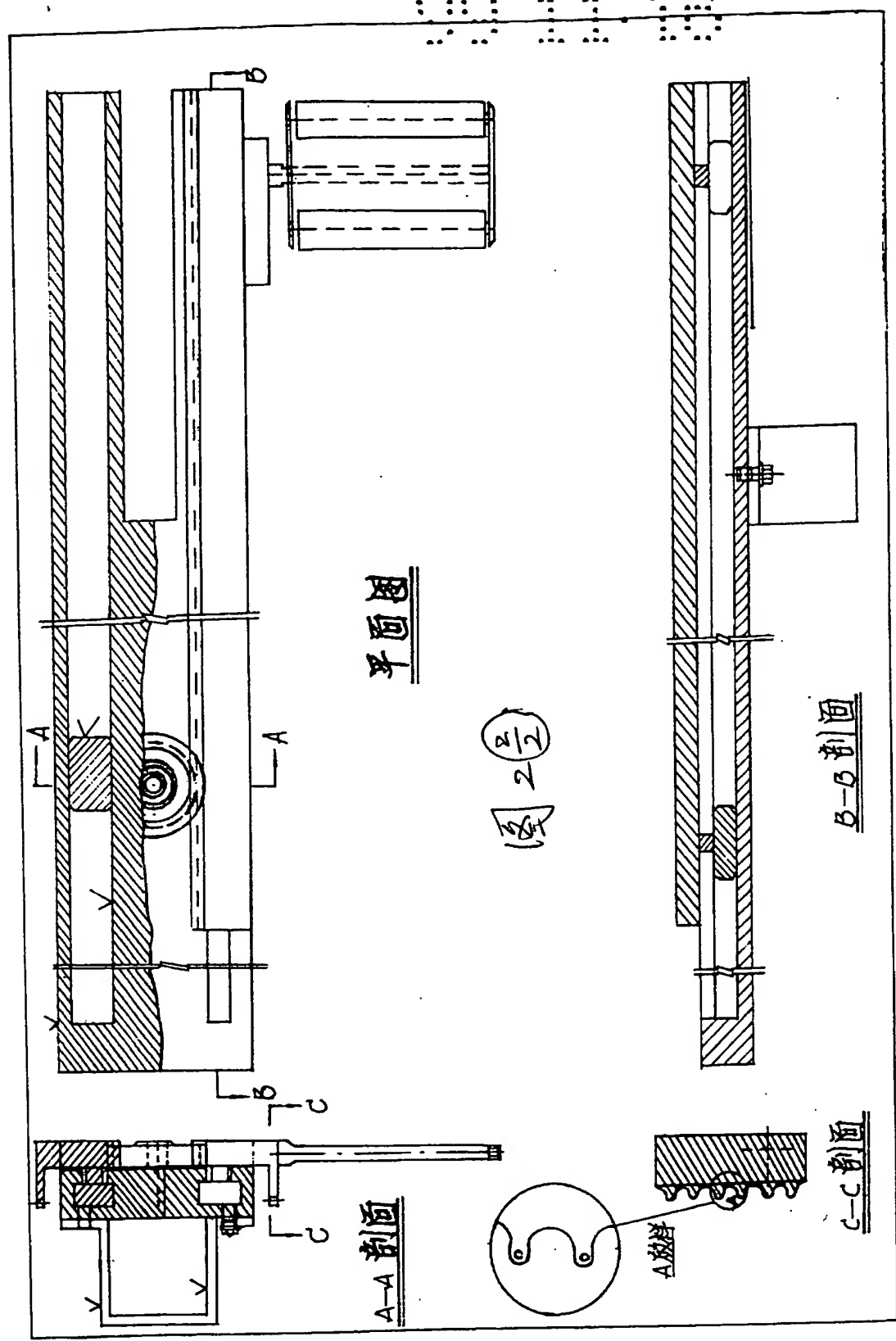
图7是LY—Z型自行车前下飞轮轴套筒及伸缩杆

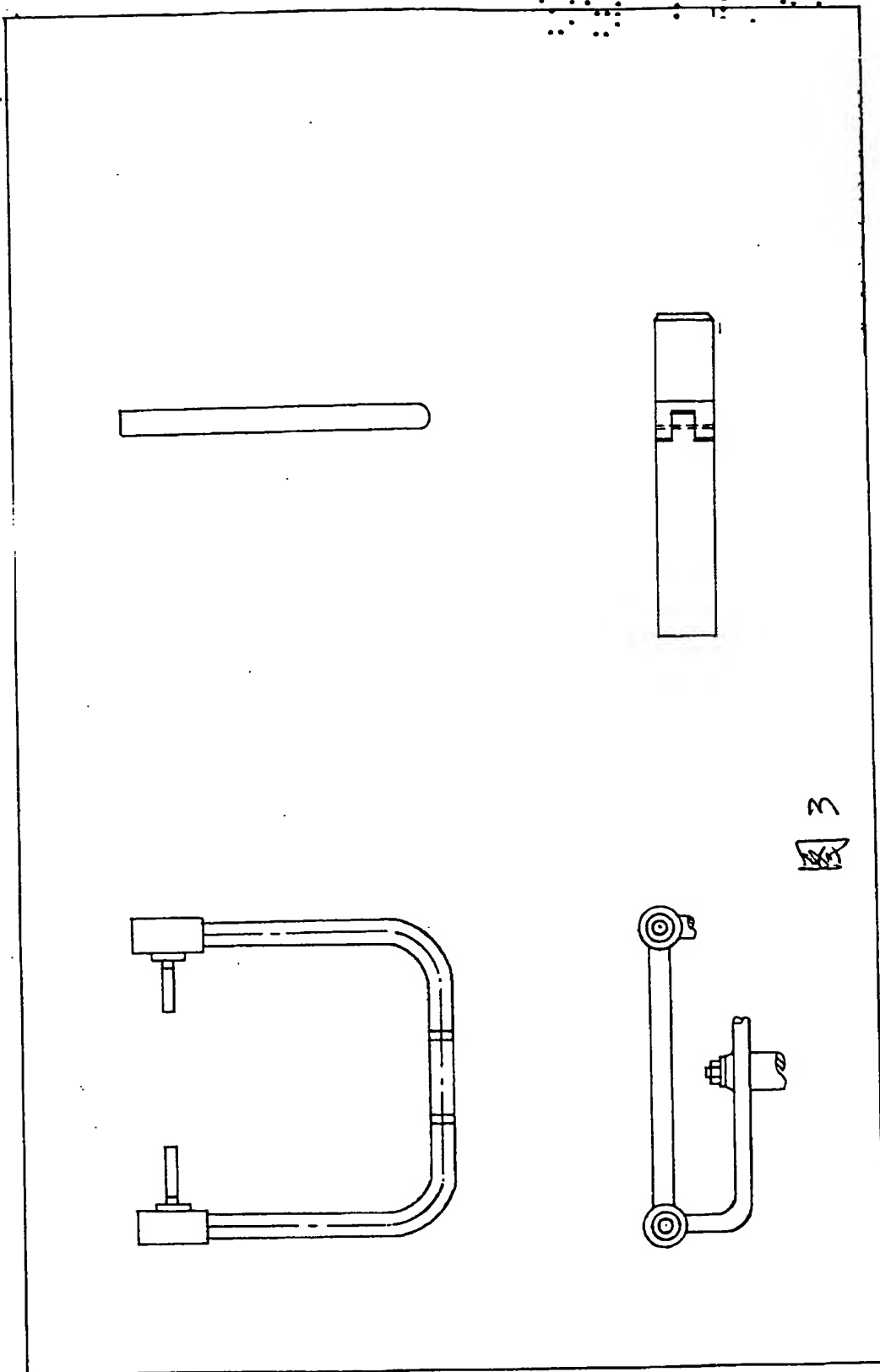
图8是LY—Z型自行车飞轮与轴承固定结构图

图9是LY—Z型自行车架子结构图

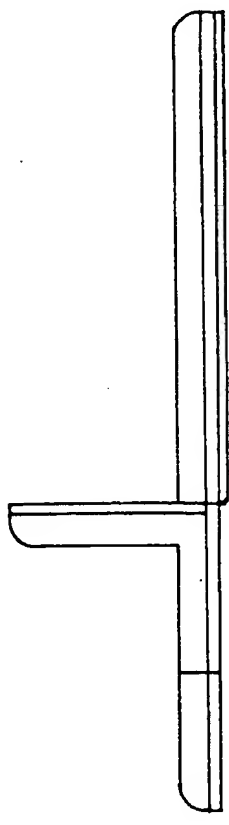




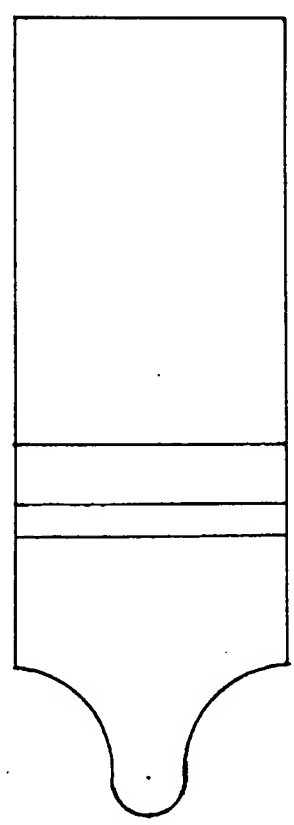




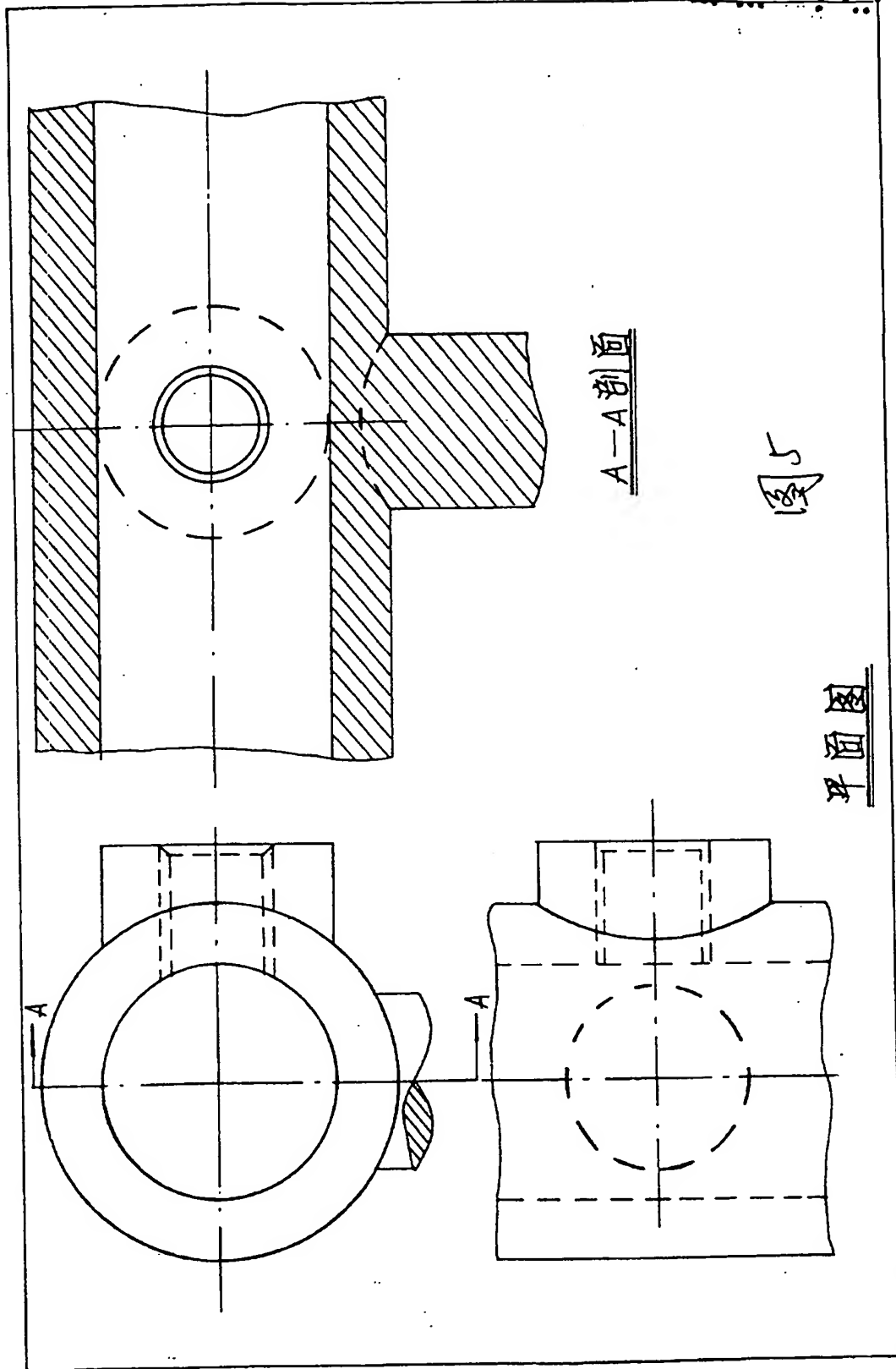
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側面圖

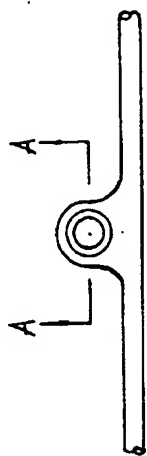


平面圖

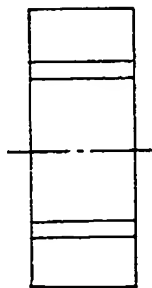


平面图

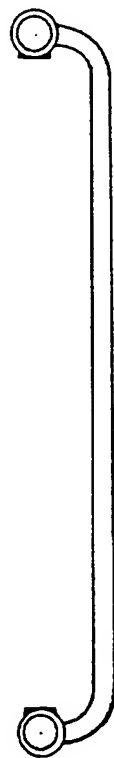
图5



平面图

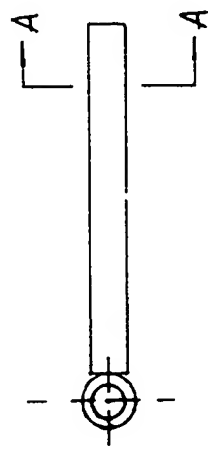


A—A剖面



俯视图

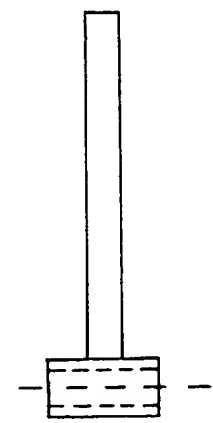
图 6



側視圖



A-A剖面

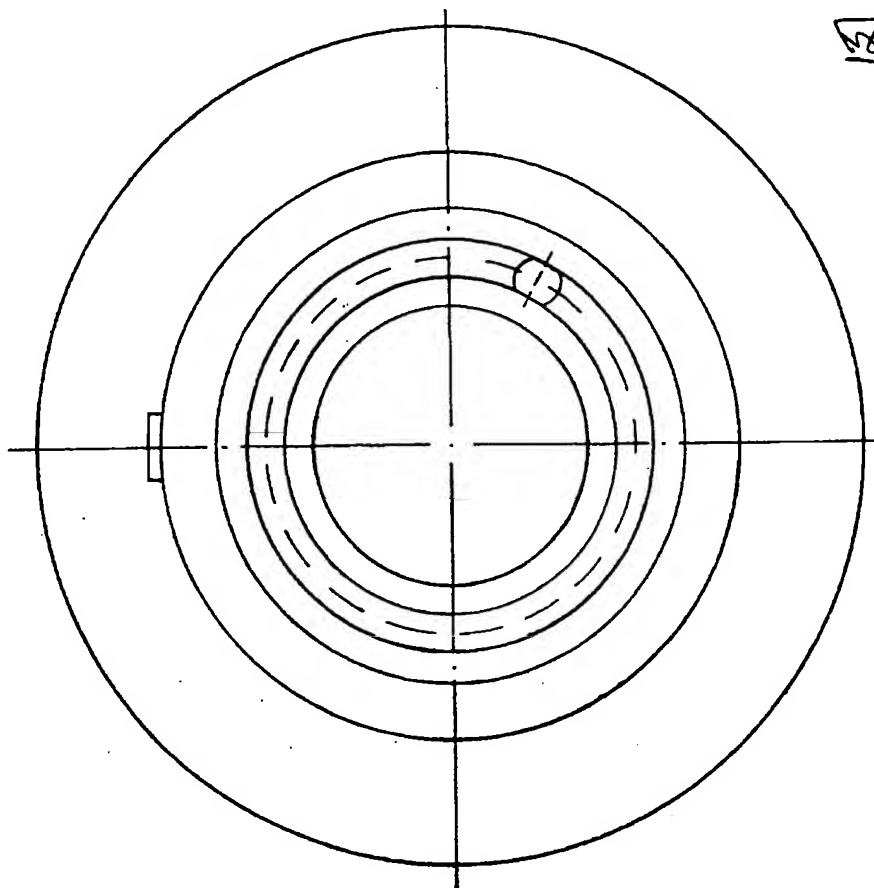


平面圖

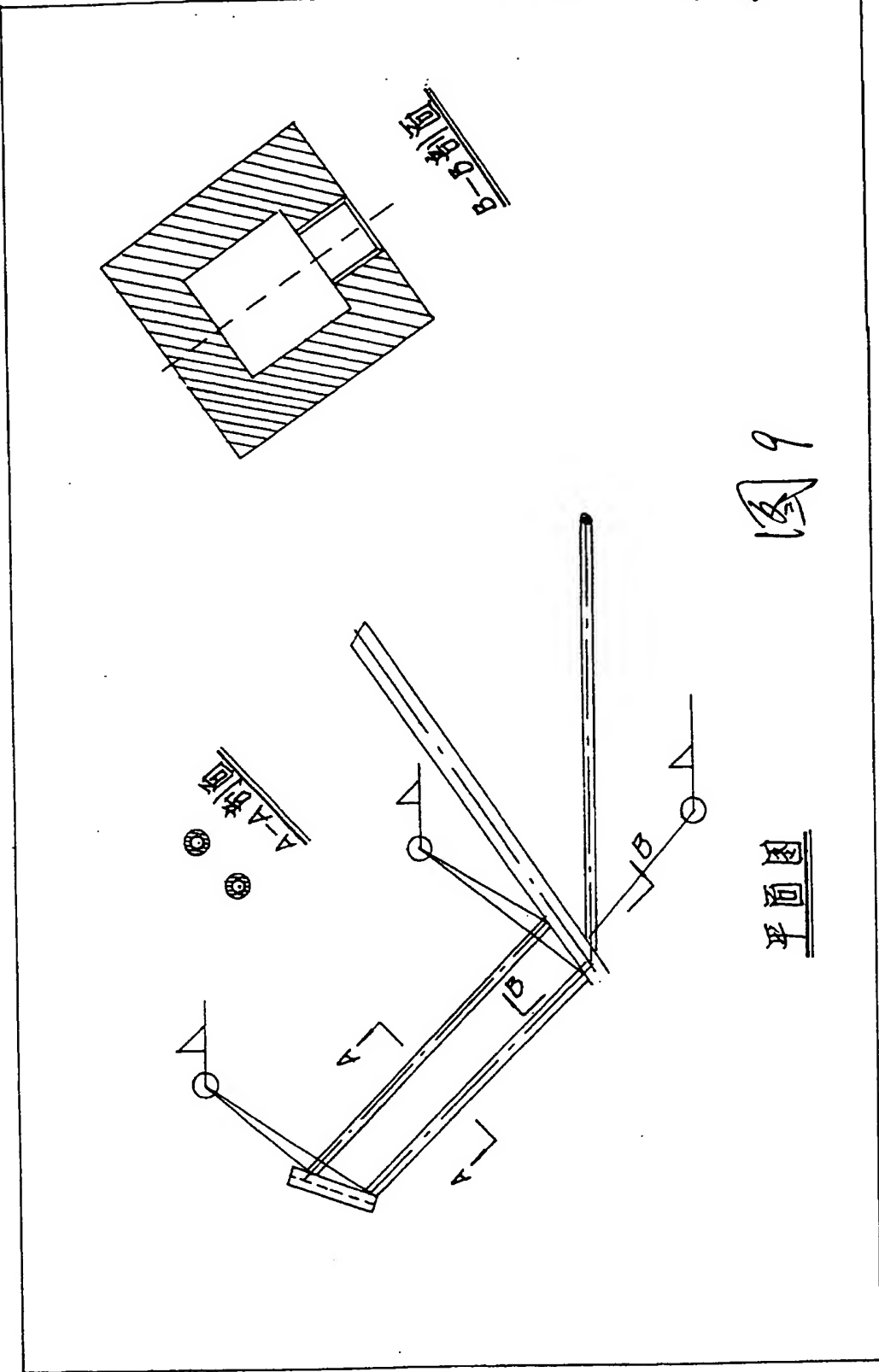
圖7

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[19]中华人民共和国国家知识产权局

[51]Int. Cl⁷

B62K 3/00

B62M 1/04

[12] 发明专利申请公开说明书

[21] 申请号 99123093.0

[43]公开日 2001 年 6 月 13 日

[11]公开号 CN 1298824A

[22]申请日 1999.12.9 [21]申请号 99123093.0

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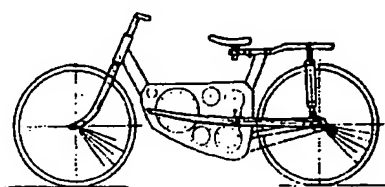
[72]发明人 夏殿文

权利要求书 1 页 说明书 1 页 附图页数 1 页

[54]发明名称 摇杆式自行车

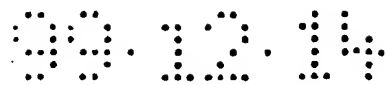
[57]摘要

一种摇杆式自行车,由前后轮、减震转向器、车架、后减震器、原动摇杆、从动摇杆、前后左右大小链轮、长短链条等传动系统组成。骑车人只须上下直线 踩动摇杆,便可轻松快速前进。比普通自行车要省力 73%,速度要快 68%,有 4 档变速。



ISSN 1008-4274

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权 利 要 求 书

1、一种摇杆式自行车，其特征是由减震转向器（3）、后叉（19）、后减震器（11）、后架（10）连接于车身（4）、通过左右原动摇杆（14）、连杆（22）、调速器总成（9）、左右从动摇杆（5）、滚轮（6）、传动于左右小链轮（12）、一号大链轮（13）、再通过短链条（15）、传动于中间小链轮（17）、二号大链轮（16）、长链条（18）、后小链轮（21）以及钢丝绳（23）完成左右传动、

2、根据权利要求 1 所述的一种摇杆式自行车，其特征是左右原动摇杆（14）、左右从动摇杆（5）、左右小链轮（12）、一号大链轮（13）、中间小链轮（17）、二号大链轮（16）装配于车身（4）上、

3、根据权利要求 1 所述一种摇杆式自行车，其特征是钢丝绳（23）与左右从动摇杆（5）连接、

4、根据权利要求书 1 所述一种摇杆式自行车，其特征是后减震器（11）与后叉（19）、后架（10）连接、



说明书

摇杆式自行车

本发明涉及一种用摇杆传动的自行车。

目前，各种非机动车都是曲柄式踏板回转传动前进，每小时最快约 20 多公里，遇到较长上坡时，十分费力，踏不动时只好下车推车上行，且前后都无缓冲减震装置。

本发明的目的是克服上述上坡费力、速度较慢和无缓冲减震装置而提供一种可缓冲减震、省力、快速的非机动车代步工具。

本发明的技术方案是：（结合附图），骑车人的左右脚上下直线踩动左右原动摇杆（14），原动摇杆（14）后端连接在后轮轴上，约近中部（偏后）装一连杆（22），带动左右从动摇杆（5）及装上面的几个滚轮（6），由从动摇杆（5）和滚轮（6）传动左右内有棘轮的小链轮（12），左右小链轮（12）转动时带动同一轴上的一号大链轮（13）再通过短链条（15）传动中间小链轮（17）同时传动同一轴上的二号大链轮（16）又通过长链条（18）传动后小链轮（21）后小链轮装在后轮毂上，即带动后轮旋转，完成驱动前进工作。注：左右小链轮（12）因内有棘轮，所以从动摇杆回升时的倒转是空转，左右轮流转动，形成其轴不间断地旋转。钢丝绳（23）拉动左右摇杆回升。刹车采用常规刹车装置。

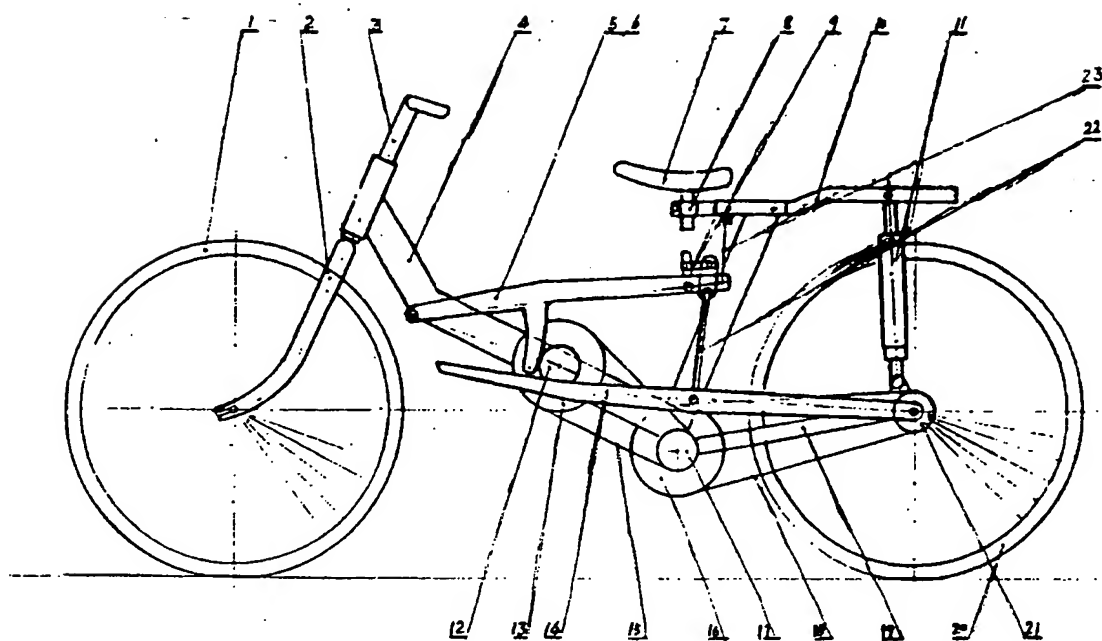
由于应用杠杆（即摇杆）四两拨千斤的原理，利用了骑车人体和车本身重量的压力，大大减轻了脚踩的力量，比曲柄式自行车要省力约 73%，因增加了一道变速装置，速度要快 68%。因有调速装置（9）可调四个档，上坡时可调到最低速，每小时 22.2 公里，又可省力 21%，平路调到高速，每小时可达 33.6 公里。试骑：一个 9 岁小男孩一小时行了 34 公里多一点，路上有上、下坡及平路，是普通公路。前转向立轴改成了减震转向器，后立撑改成了减震器（11）。所以又增加下列优点：即保护了前后轮轴，又起了缓冲作用，使骑车人感到弹性的舒适。车把和车座的安装结构采用了可调高低和前后的机构，用户可按需调整。

下面结合附图对本发明进一步的描述。

图中 1.前轮，2.前叉，3.减震转向器，4.车身，5.左右从动摇杆，6.滚轮，7.车坐，8.调整器，9.调速器总成，10.后架，11.后减震器，12.左右小链轮，13.一号大链轮，14.左右原动摇杆，15.短链条，16.二号大链轮，17.中间小链轮，18.长链条，19.后叉，20.后轮，21.后小链轮，22.连杆，23.钢丝绳。

实施例：参照图中 1、2、7、12、16、17、18、20、21 系自行车标准件。其余全部由高强度钢板和钢管及元钢等制成。

说明书附图



[19] 中华人民共和国国家知识产权局

[51] Int. Cl.⁷
B62M 23/00



[12] 发明专利申请公开说明书

[21] 申请号 01132621.2

[43] 公开日 2003 年 4 月 2 日

[11] 公开号 CN 1406810A

[22] 申请日 2001.8.30 [21] 申请号 01132621.2
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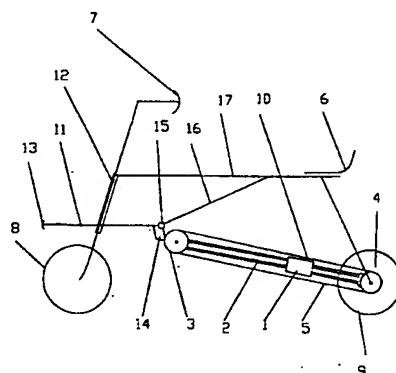
[74] 专利代理机构 宁夏专利服务中心
代理人 郭立宁

权利要求书 1 页 说明书 3 页 附图 9 页

[54] 发明名称 牵拉式拨链自行车

[57] 摘要

本发明涉及一种采用直线施力驱动装置的自行车。在现有自行车结构的基础上，取消了齿板、脚踏，加长链条，斜梁前端设置一绷紧链条的从动链轮，在上下链条之间设置一受绳索牵拉的拨链器，拨链器安装在呈导轨状的后叉右侧臂上。绳牵引拨链器，抓链齿抓住并拉动链条，驱动自行车前行。本发明省力效果明显，结构简单、紧凑，加上座椅装置，避免了对会阴部及男士阴囊的压迫，有利于人体健康。



ISSN 1008-4274

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1. 牵拉式拨链自行车，包括飞轮（4）、链条（5）、前轮（8）、后轮（9）、斜梁（16）和横梁（17），其特征在于该拨链自行车取消了现有自行车的齿板、脚蹬等组成的施力系统，加长链条（5），在斜梁（16）前端位置设置一可绷紧链条的从动链轮（3），在上、下链条之间设置一受绳牵拉的拨链器（1），拨链器安装在被加工成导轨状的后叉右侧臂（2）上，拨链器（1）上设置有抓链齿（10）。

2. 根据权利要求1所述的牵拉式拨链自行车，其特征在于拨链器（1）上的抓链齿有两个，即上抓链齿（10a）和下抓链齿（10b），拨链器（1）通过安装在其上的卡轨轮（18）卡接在后叉右侧臂（2）上，拨链器（1）上装有可顶出抓链齿的传力杠杆（1b），（1b）上有可系接牵引绳的绳孔（1d），抓链齿与滑移杆（10c）制做成一体，滑移杆（10c）位于拨链器（1）壁上的滑槽（1a）中。

3. 根据权利要求1和2所述的牵拉式拨链自行车，其特征在于在后叉右侧臂（2）的后端安装有用以导引牵引绳的拉绳换向滑轮（25）并预留绳导引孔，滑轮（25）通过销轴（24）和侧板，安装在后叉右侧臂上。

4. 根据权利要求1所述的牵拉式拨链自行车，其特征在于在滑道（11）上装有蹬力脚套装置，该装置包括蹬套（29）、槽轮（28）和连接板（27），蹬套（29）与连接板（27）焊接在一起，槽轮（28）通过销轴安装在连接板（27）上，槽轮（28）卡接在滑道（11）上。

牵拉式拨链自行车

技术领域：

本发明涉及一种采用直线施力驱动装置的自行车，

背景技术：

自行车距今已有一百多年的历史，目前涉及自行车的改进形式多种多样，如针对转圈蹬踏方式的改进，轻便化改进以及座椅状况改进等。特别是针对自行车如何省力的改进形式，每年都有一些专利申请。如公开号为CN1275511A的《LY-Z型自行车》（申请号99108216.8）发明专利申请，将驱动系统安装在方斜梁上，着力脚蹬，带动斜梁两边滑道内的齿条，齿条由安装在斜梁上的复位齿轮控制，往复运动，拉动链条，驱动自行车，该结构方案在滑道中设置了两根可移动的齿条，两侧各有三只飞轮及挂于其上的链条，总共要有六只飞轮和两根长链条。无形中增加了结构的复杂性，难以实现商品化。

发明内容：

针对现有技术的不足之处，本装置在拉动链条装置上作了进一步改进，本发明是在现有自行车结构的基础上，取消了齿板、脚蹬等施力系统，加长链条，在斜梁前端位置设置一可绷紧链条的从动链轮，在上下链条之间设置一受绳牵拉的拨链器，拨链器被安装在被加工成导轨状的后叉右侧臂上，拨链器上设置有抓链齿。本发明的飞轮、链条、前后轮、斜梁和横梁等零部件结构与现有自行车大致相同。通过绳牵引的拨链器可在后叉右侧臂上往复移动，可以或上或下伸出的抓链齿抓住并拉动链条，驱动自行车前行。拨链器的特殊功能是向前移动时，上抓链齿伸出，拉动上层链向前；当拨链器运行到前方位置时改换施力方向，上抓链齿缩回，下抓链齿同步伸出，拉动下层链向后，并拖动飞轮旋转，如此往复，不断驱动自行车轮向前滚动。为了配合拉动链条装置的改进，本发明设置了蹬力脚套装置，拨链器上的牵引绳与蹬力脚套相系接，蹬力脚套安装在固定在斜梁和转向轴套管上的滑道上，可沿滑道往复运动。此外，本发明将骑坐改为座椅状。

本发明和现有技术相比，有如下有益效果：1.由于本发明施力方式恰当，用力方向正确，固而具有明显的省力效果，既适用于平坦地区，也适用于有坡地的山城；2.本发明与现有的直蹬式自行车方案相比，结构简单紧凑，没有空运转过渡过程，并可实现小型化，便携、安全；3.本发明将骑座改为半靠背式座椅，避免了长期骑车对会阴部及男士阴囊压迫之苦，有利于人体健康。

图1为本发明的总体结构图。如图所示：1—拨链器 2—后叉右侧臂 3—链轮 4—飞轮 5—链条 6—座椅 7—带车把的转向轴 8—前轮 9—后轮 10—抓链齿 11—前滑道 12—转向轴套管 13—护板 14—连接板 15—联接管 16—斜梁 17—横梁。飞轮（4）、链条（5）、带车把的转向轴（7）、前轮（8）、后轮（9）、斜梁（16）、横梁（17）保持现有自行车的基本结构，本发明主要特征是使原有的链条（5）加长，并在斜梁（16）前端设置一可绷紧链条的从动链轮（3），在上、下链条之间设置了受绳索牵拉的拨链器（1），拨链器被安装在导轨状的后叉右侧臂（2）上，拨链器（1）上设置有抓链齿（10）。在转向轴套管（12）和联接管（15）上安装有滑道（11），滑道（11）上可安装蹬力脚套。

图2、图3和图4为拨链器结构示意图。拨链器（1）通过四个带槽的卡轨轮（18）安装在后叉右侧臂（2）上。（19）为牵引绳孔。图4为拨链器内部结构的示意图，其中：1a为滑槽，1b为传力杠杆，1c为销轴，1d为绳孔（用于系牵引绳）。10a为上抓链齿，10b为下抓链齿，10c为滑移杆，10d为突缘。1a固定在拨链器（1）壁上，滑移杆（10c）在其中移动；用于拨动抓链齿的传力杠杆（1b）通过销轴（1c）安装在拨链器壁上，上下位置各一个，突缘（10d）的作用为16推动的着力处及限制抓链齿的突起程度。拨链器还可有多种结构形式，本发明只例举了其中一种。

图5为链轮安装位置附近的相关零部件结构示意图。滑道（11）通过连接件（21）与转向轴套管（12）相连接，后叉左侧臂（23）通过连接板（14）与联接管（15）相连接；后叉右侧臂（2）通过活动连接板（20）与联接管（15）相连接；滑道（11）的后端和斜梁（16）的前端分别连接到联接管（15）上，后叉右侧臂和后叉左侧臂之间装有连接件（22），其上的U字型缺口用于安装链轮（3）。联接管（15）和连接件（22）上的位置，用于安装牵引绳转向滑轮。

图6、图7为后部牵引绳用滑轮装置结构图。在接近飞轮处的后叉右侧臂（2）上装有两个对称的滑轮（25），牵引绳通过滑轮和绳导引孔与蹬力脚套相连接，（24）为安装滑轮的销轴。

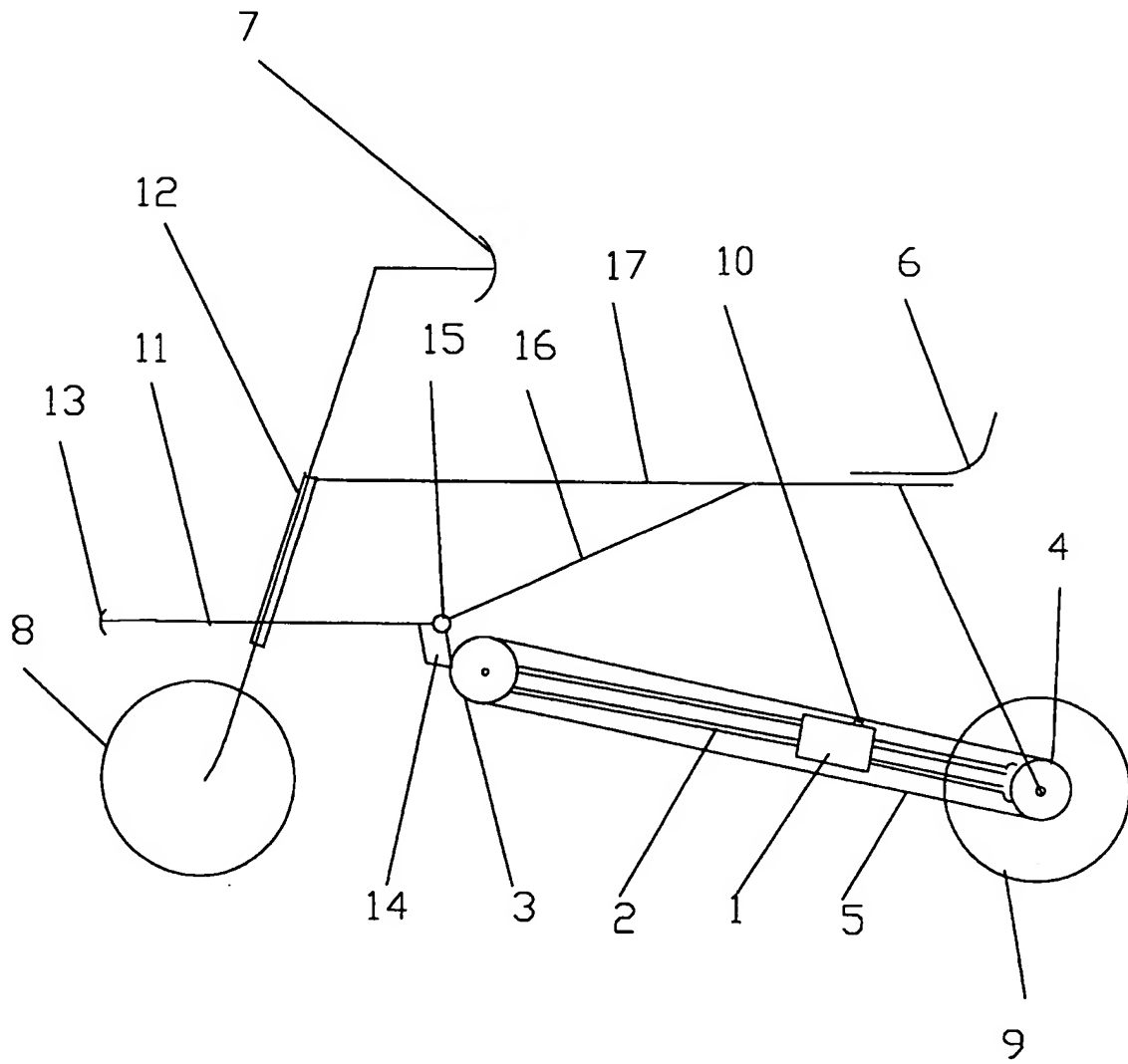
图8、图9为蹬力脚套及其安装在滑道上的结构示意图。如图8、图9所示，蹬力脚套装置包括脚套（29）、连接板（27）、槽轮（28），槽轮（28）通过连接板（27）与脚套（29）相连接，该装置通过槽轮（28）卡装在滑道（11）上。

具体实施方式：

本发明的前轮、后轮、转向轴装置、链轮、飞轮、横梁、斜梁及支撑架结构基本保持不变，取消了齿板、脚蹬，加长了链条。在斜梁（16）前端位置设置一可绷紧链条的从动链轮（3），拨链器（1）安装在起导轨作

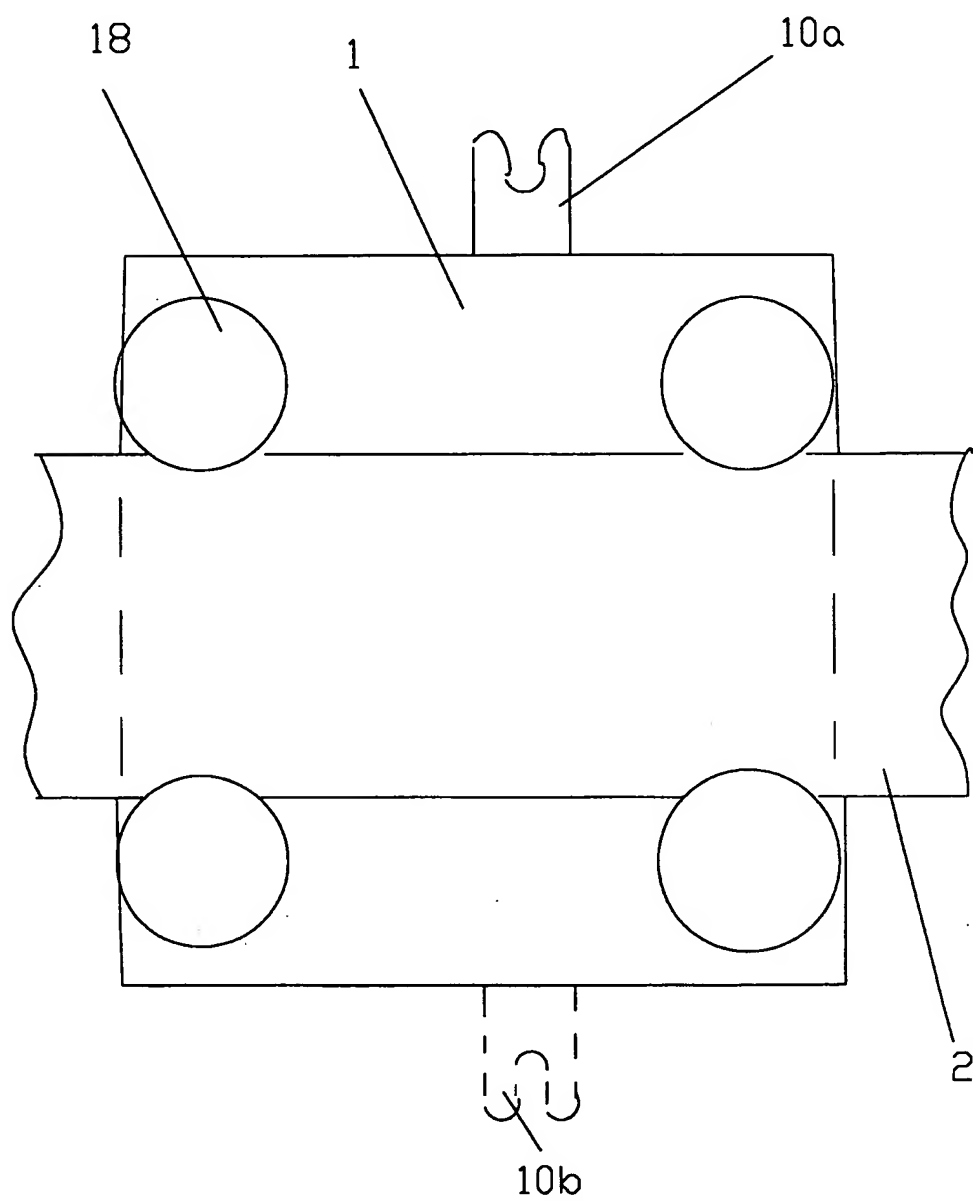
用的后叉右侧臂上，拨链器上的抓链齿有两个，即上抓链齿（10a）和下抓链齿（10b），拨链器（1）上装有可顶出抓链齿的传力杠杆（1b）。牵引绳通过其上的绳孔（1a）系接后，经相关滑轮转向连接至左、右两只脚套（29）上。在本发明中，力臂与重臂之比就是飞轮工作半径与车轮工作半径之比，可在 1.8-3.5 之间选定。因飞轮直径不宜过大，车轮直径也不能过大，以 30—35cm 范围为宜。

使用本发明时，当左脚前蹬，作用于前拉绳牵引绳动作，触动拨链器（1）内的传力杠杆，使上抓链齿伸出，插入链条孔中，带动上层链条前行，从而带动飞轮（4）转动，使后轮前行。当换成右脚前蹬时，触动拨链器内传力杠杆，收回上抓链齿，伸出下抓链齿插入下层链条，向后拉动链条，带动飞轮转动。如此往复，不断驱动自行车前行。



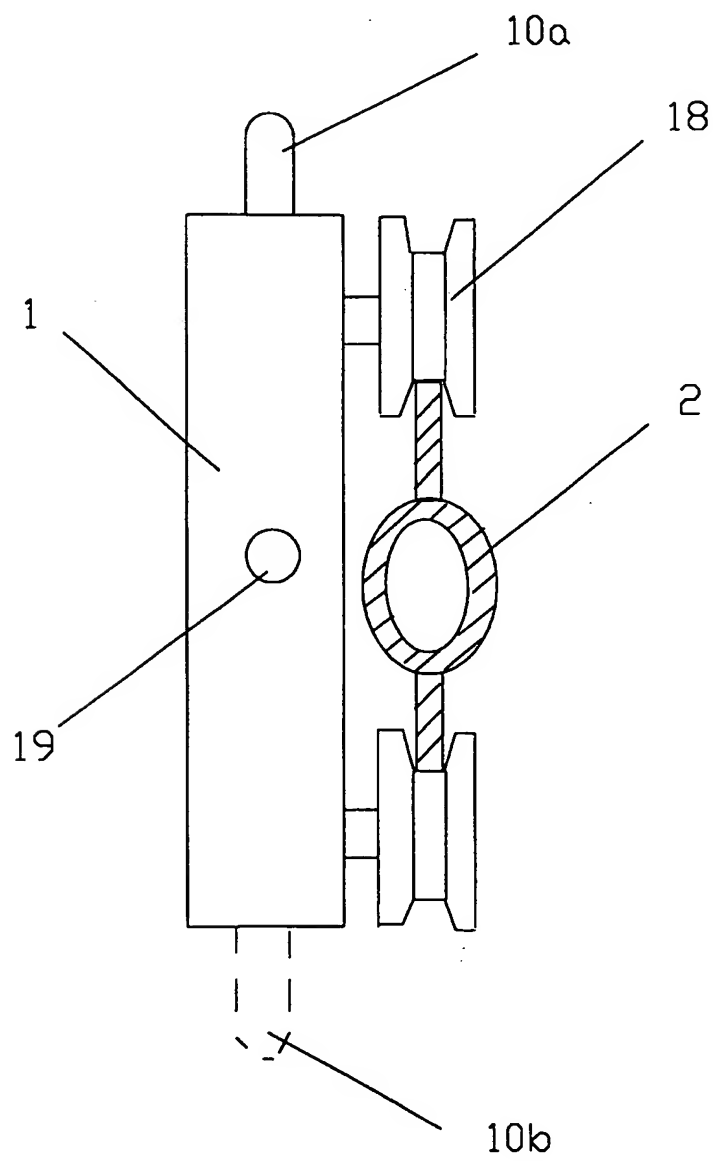
图

1.



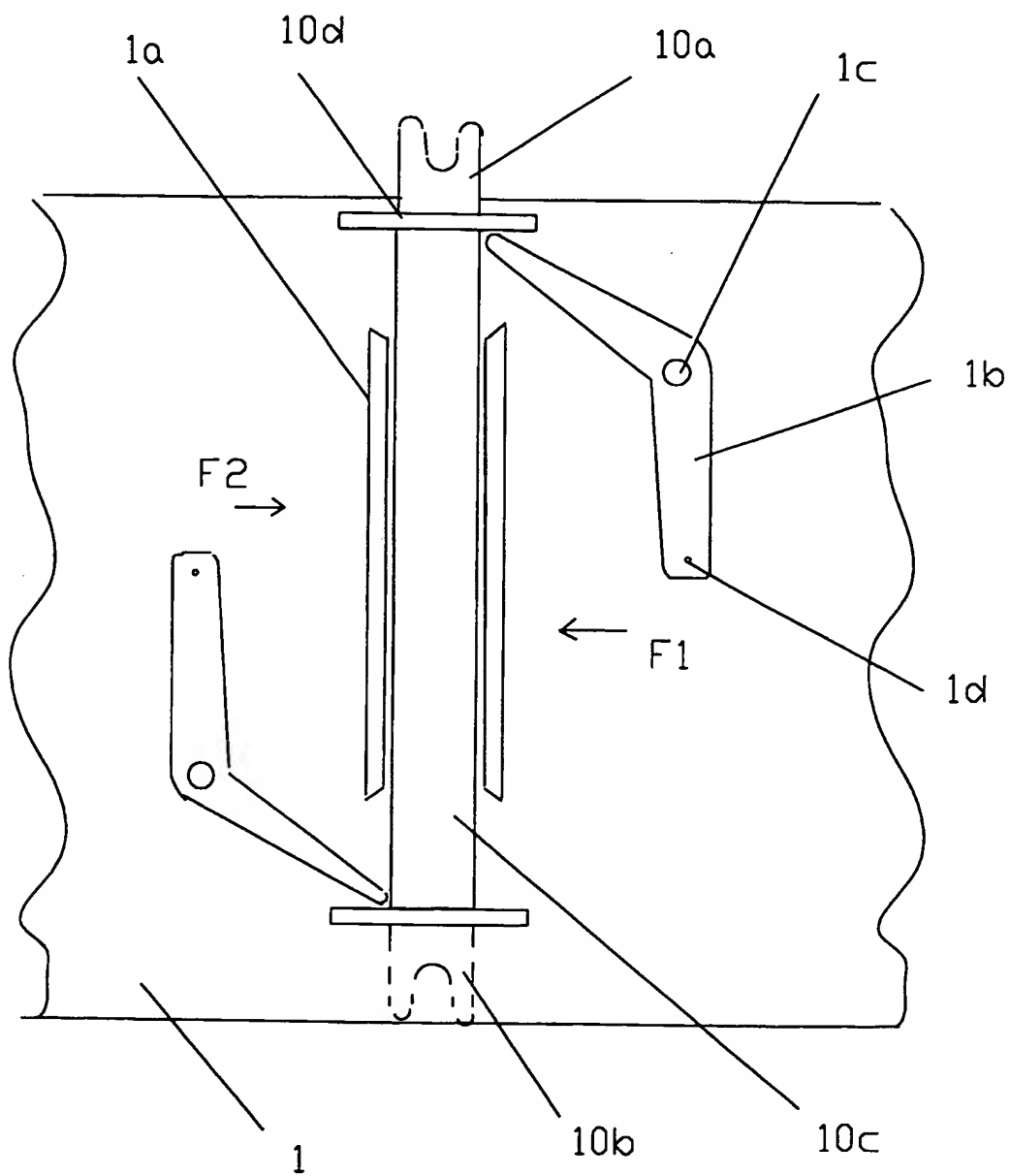
图

2



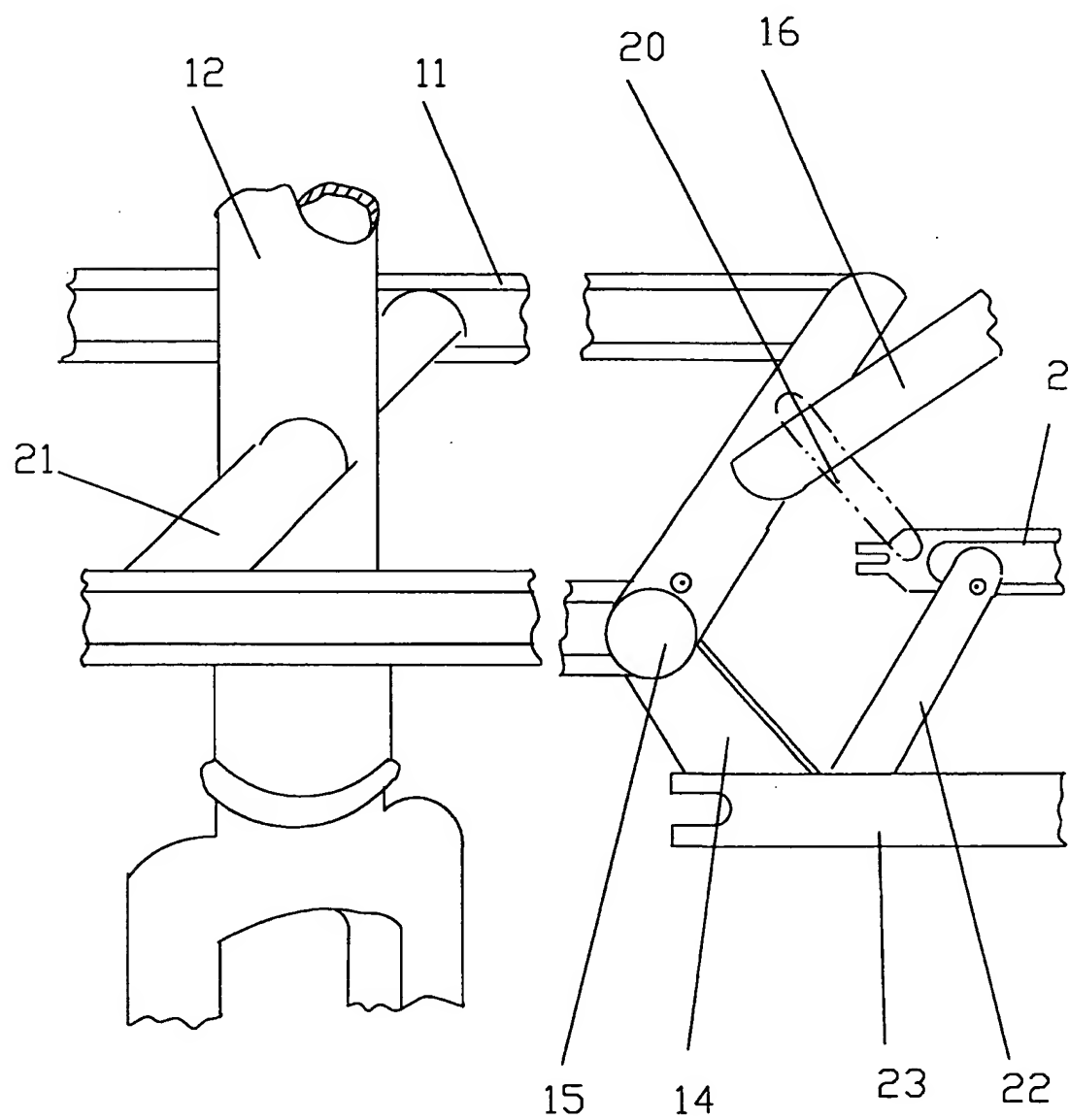
图

3



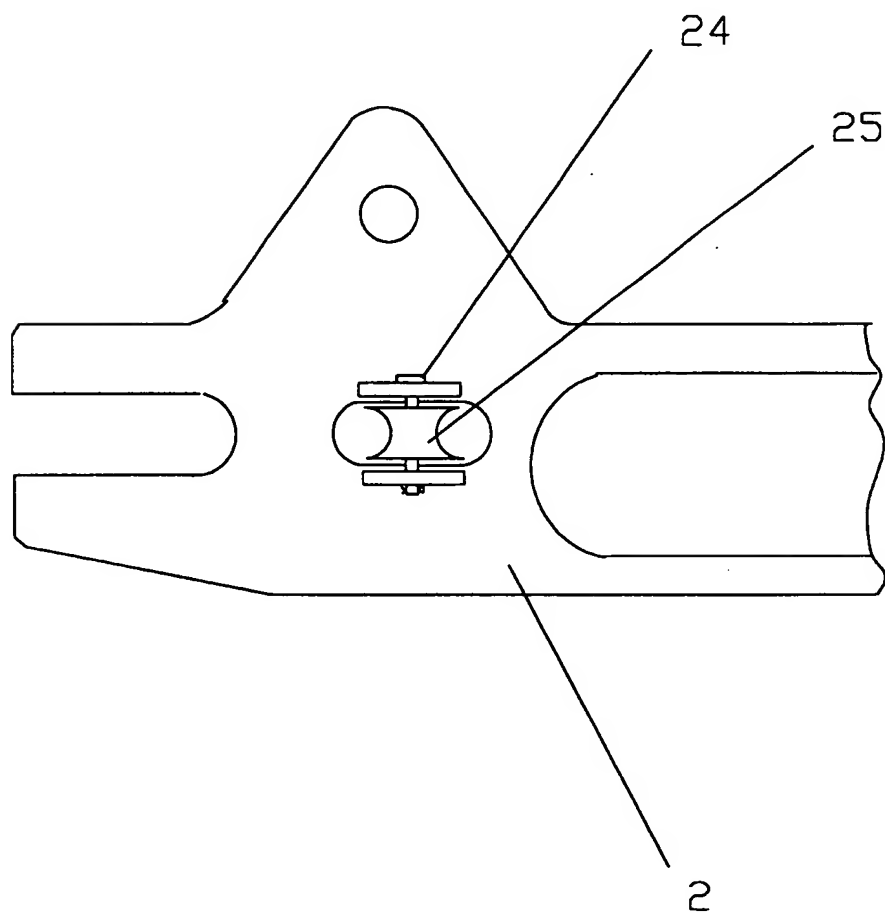
图

4



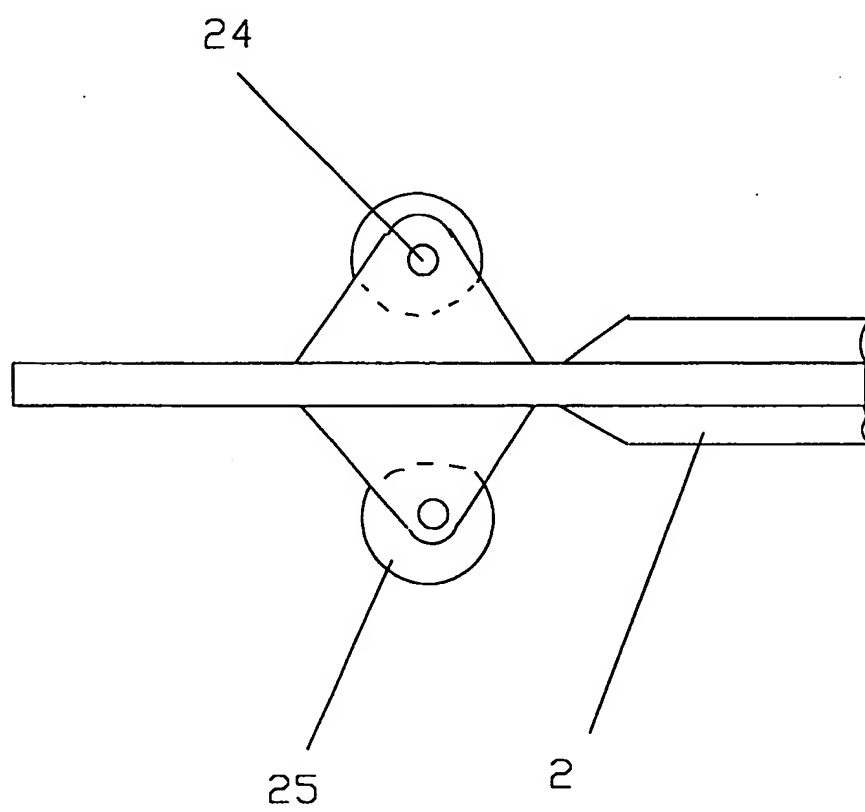
图

5



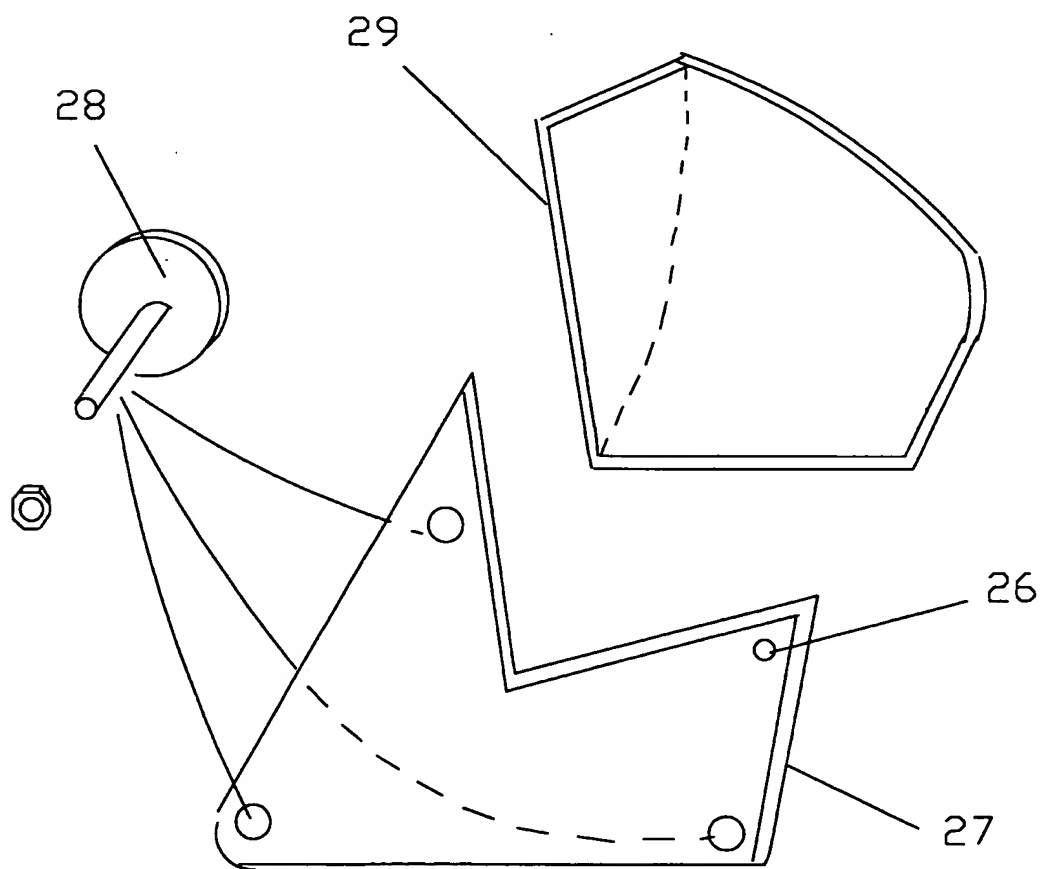
图

6



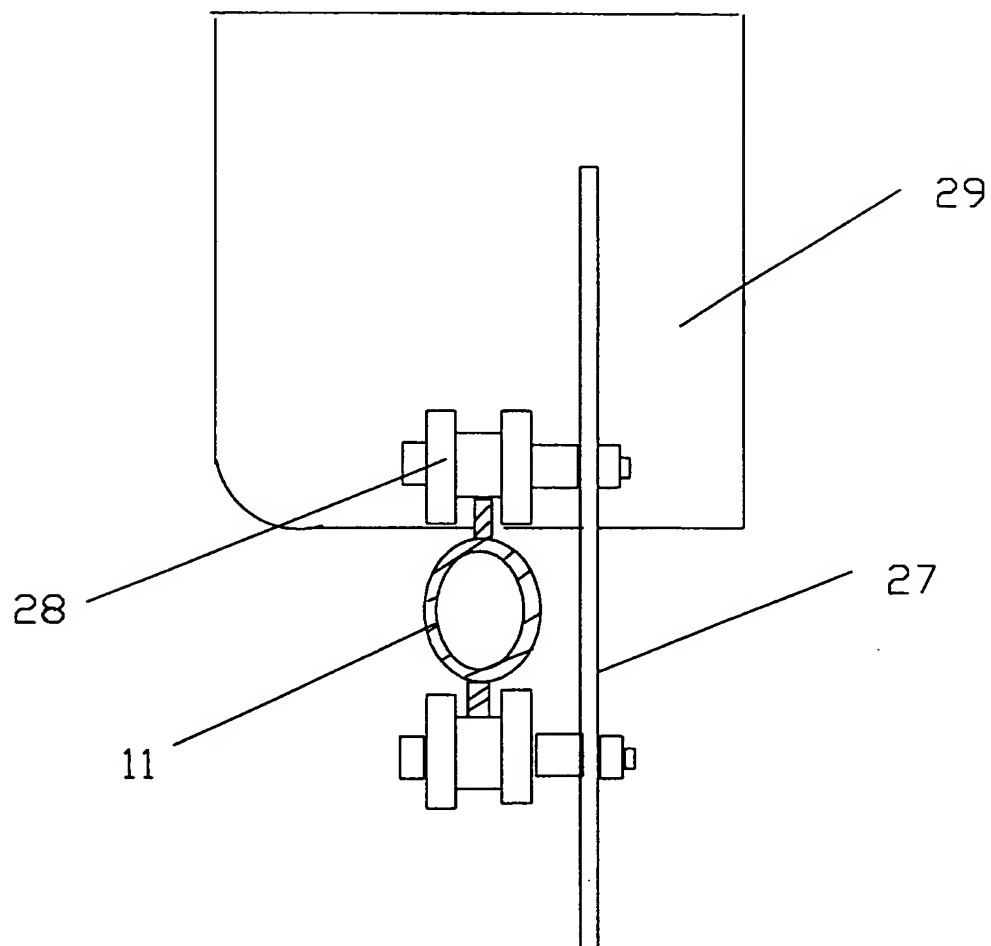
图

7



图

8



图

9